

COURSE UNIT DESCRIPTION - PHYSICS

Course unit title	Code
PHYSICS	

Lecturer(s)	Department(s)
Coordinator: Dr. Vidita URBONIENĖ Other(s):	Faculty of Physics, Department of General Physics and Spectroscopy, Saulėtekio al. 9, 10222 Vilnius

Cycle	Level of the course unit	Type of the course unit
Full-time studies (1 st stage)	1 out of 1	Compulsory

Mode of delivery	Period of delivered	Language(s) of instruction
Face to face	2 th semester, spring	Lithuanian (English)

Prerequisites and corequisites	
Prerequisites: Linear algebra and geometry	Corequisites (if any): None

Number of credits allocated to the course unit	Student's total workload	Contact hours	Self-study and research hours
9	232	112	120

Purpose of the course unit: programme competences to be developed
The course unit aims to develop: <i>Subject specific competences:</i> - knowledge and skills needed to create a physical world's image in general level; - physical science and information technology knowledge required to work with physical methods and equipment; - basic knowledge about physical methods used for research of molecular systems; - skills to analyze, compare, critically evaluate and explain physical processes ongoing in molecular systems. <i>General competences:</i> - analytical and critical thinking - skills for self-development, learning skills in order to study general science resources;

Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
- Describes the concepts of fundamental physics; - Applies knowledge of the physical sciences and information technologies to investigate molecular systems - Analyses, compares and critically evaluates the information from different sources required for research of molecular systems; - Describes application possibilities of the basic physical methods; - Interprets research data in terms of the physical aspect; - Applies their knowledge and understanding; - Demonstrates a single holistic natural science worldview.	Lectures, practical work, self-directed learning, solutions of tasks.	Colloquium Exam

Content: breakdown of the topics	Contact hours							Self-study work: time and assignments	
	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work	Contact hours	Self-study hours	Assignments
1. Basic mechanics	10			9	9		28	24	
Kinematics of translation and rotary motion	3			3	3		9	6	Read the literature on the themes; to solve tasks.
Dynamic of translation and rotary motion	3			2	2		7	6	To prepare for practical work „Testing dynamic law of rotary motion “; to solve tasks.
Mechanical work Energy	2			2	2		6	6	Read the literature on the themes; to solve tasks.
Mechanical oscillations Composition of oscillations	2			2	2		6	6	To prepare for practical work „Measure the threshold of hearing and its dependence on sound frequency “; to solve tasks.
2. Molecular and statistical physics	10			9	9		28	30	
The kinetic molecular theory of gases	2			2	2		6	6	To prepare for practical work „Measurement Of Blood Pressure“; to solve tasks.
Elements of statistical physics	2			2	2		6	6	Read the literature on the themes; to solve tasks.
Real gas	2			1	1		4	6	Read the literature on the themes; to solve tasks.
Expression in disequilibrium systems	2			2	2		6	6	Read the literature on the themes; to solve tasks.
The collective state The disequilibrium systems	2			2	2		6	6	To prepare for practical work „Measurement Of Air Humidity By Assmann Psychrometer “; to solve tasks.
3. Electricity and Magnetism	10			6	6		22	26	
Electric charges. The electric field	2			2	2		6	4	Read the literature on the themes; to solve tasks.
Permanent electrical flow	2			2	2		6	4	To prepare for practical work „Testing A Pacemaker “; išspręsti uždavinius.
Magnetic field	2			1	1		4	4	Read the literature on the themes; to solve tasks.
Electromagnetic induction	2						2	4	Read the literature on the themes; to solve tasks.
Magnetic field in material	1			1	1		3	5	Read the literature on the themes; to solve tasks.
Electromagnetic oscillations and waves	1						1	5	To prepare for practical work „Electrocardiography: recording and analysis “; to solve tasks.
4. Optics	9			4	4		17	16	
The main optical expressions	1						1	3	To prepare for practical work „Measurements With Microscope“; to solve tasks.

Photometry	2					2	2	Read the literature on the themes; to solve tasks.
Light and matter interactions: absorption	2			2	2	6	3	To prepare for practical work „Light Absorption In Solutions “; to solve tasks.
Interaction of light with matter: diffusion	2			1	1	4	4	Read the literature on the themes; to solve tasks.
Quantum properties of light	2			1	1	4	4	Read the literature on the themes; to solve tasks.
5. Wave optics	9			4	4	17	24	
Light wave interference	2			1	1	4	5	Read the literature on the themes; to solve tasks.
Light wave diffraction	2			1	1	4	5	Read the literature on the themes; to solve tasks.
Light polarization	2			1	1	4	5	To prepare for practical work „Analysis of optical activity“; to solve tasks.
Wave and particle duality	1					1	4	Read the literature on the themes; to solve tasks.
Spectroscopy in terms of the quantum theory	2			1	1	4	5	Read the literature on the themes; to solve tasks.
Total	48			32	32	112	120	

Assessment strategy	Weight, %	Assessment period	Assessment criteria
Colloquium	12,5	5 th week of the course	Two academic questions and two tasks 2 answered questions , not solved tasks - 4 (insufficient) 1 answered question and solved 1 task – 5 (sufficient) Solved 2 tasks, not answered to questions - 5 (sufficient) 2 answered questions and solved 1 task - 8 (good) Solved 2 tasks and 1 answered question - 8 (good) Solved 2 tasks and 2 answered question - 10 (excellent)
Practical works	37,5	2-15 th weeks of the course	Accomplished practical work - 5 (sufficient) Accomplished practical work and 1 answered question - 6 (satisfactory) Accomplished practical work and 2 answered questions - 7 (highly satisfactory) Accomplished practical work and 3 answered questions - 8 (good) Accomplished practical work and 4 answered questions - 9 (very good) Accomplished practical work and 5 answered questions - 10 (excellent)
Exam	50	16 th week of the course	Two academic questions and two tasks 2 answered questions , not solved tasks - 4 (insufficient) 1 answered question and solved 1 task – 5 (sufficient) Solved 2 tasks, not answered to questions - 5 (sufficient) 2 answered questions and solved 1 task - 8 (good) Solved 2 tasks and 1 answered question - 8 (good) Solved 2 tasks and 2 answered question - 10 (excellent)
Total	100		Accumulative score. (K) – score of colloquium, (L) – score of practical works and (E) score of exam: <u>$P = 0,25 (0,5K + 1,5L) + 0,5 E$</u>

Author	Year of publication	Title	Issue of a periodical or volume of a publication	Publishing place and house or web link
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Compulsory reading				
Juozas Navickas, Vidmantas Ambrasas, Dalia Girdauskienė, Ona Majauskienė, Regina Šaudienė	2008	Physics (in Lithuanian)	I, II	LŽŪU www.asu.lt/file.doc?id=25327 www.asu.lt/file.doc?id=25328
Martinėnas Bronislovas	2008	Physics (in Lithuanian)	53(075.8) (VU library)	Gediminas Technical University
Optional reading				
Butrimaitė J, Dementjev A., Dikčius G. ir kt.	2003	Physics for medical and natural science students	I, II ed. (VU library)	VU press
Tamašauskas A., Vosylus J.	1989/ 1992	Physics	I - IV ed. (VU library)	Science press